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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FLORENCE R. PON, STEVEN R. ESKILDSEN, and
ROBERT JAI KIM

Appeal 2008-1657
Application 10/676,961[1]
Technology Center 2800

Decided: July 24, 2008

Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO, and
SCOTT R. BOALICK, *Administrative Patent Judges*.

BOALICK, *Administrative Patent Judge*.

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[1] Application filed September 30, 2003. The real party in interest is Intel Corporation.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1, 2, 6-10, 31, and 32.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

STATEMENT OF THE CASE

Appellants' invention relates to the stacking of semiconductor dies in a die assembly. (Spec. paragraph [0014].)

Claim 1 is exemplary:

1. A method comprising:

> stacking an upper die having upper top and bottom surfaces and upper first, second, third, and fourth edges on top of a lower die having a lower top surface and lower first, second, third, and fourth edges such that the upper first edge is displaced from the lower first edge by a first distance, the upper first and third edges being opposite to each other, the lower first and third edges being opposite to each other, the upper bottom surface facing toward the lower top surface such that bond pads on the upper die facing downward while bond pads on the lower die facing upward;
>
> attaching the upper die to the lower die with an adhesive layer between the upper and lower dies; and
>
> attaching the upper die to a third die such that the lower die, the upper die, and the third die are stacked in a stair-case configuration.

[2] Claims 3-5 and 11-30 have been withdrawn.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Hung	US 6,476,474 B1	Nov. 5, 2002
Khandros	US 5,998,864	Dec. 7, 1999

Claims 1, 2, 6-10, 31, and 32 stand rejected under 35 U.S.C. § 103(a) as being obvious over Hung and Khandros.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).[3]

ISSUE

The issue is whether Appellants have shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a).

[3] Except as will be noted in this opinion, Appellants have not presented any substantive arguments directed separately to the patentability of the dependent claims. In the absence of a separate argument with respect to those claims, they stand or fall with the representative independent claim. *See* 37 C.F.R. § 41.37(c)(1)(vii).

PRINCIPLES OF LAW

All timely filed evidence and properly presented arguments are considered by the Board in resolving an obviousness issue on appeal. *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

In the examination of a patent application, the Examiner bears the initial burden of showing a prima facie case of unpatentability. *Id.* at 1472. When that burden is met, the burden then shifts to the Applicant to rebut. *Id.*; *see also In re Harris*, 409 F.3d 1339, 1343-44 (Fed. Cir. 2005) (finding rebuttal evidence unpersuasive). If the Applicant produces rebuttal evidence of adequate weight, the prima facie case of unpatentability is dissipated. *In re Piasecki*, 745 F.2d at 1472. Thereafter, patentability is determined in view of the entire record. *Id.* However, on appeal to the Board it is the Appellant's burden to establish that the Examiner did not sustain the necessary burden and to show that the Examiner erred. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [for obviousness] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).

In *KSR*, the Supreme Court reaffirmed that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. The Court explained:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740.

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d at 988. "To facilitate review, this analysis should be made explicit." *KSR*, 127 S. Ct. at 1741. However, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.*

The Supreme Court noted that "[u]nder the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. The Court also noted that "[c]ommon sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able

to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* "A person of ordinary skill is also a person of ordinary creativity, not an automaton." *Id.*

During examination of a patent application, a claim is given its broadest reasonable construction consistent with the specification. *In re Prater*, 415 F.2d 1393, 1404-05 (CCPA 1969). "[T]he words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal citations omitted). The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313.

ANALYSIS

Appellants contend that the Examiner erred in rejecting claims 1, 2, 6-10, 31, and 32. Reviewing the record before us, we do not agree. In particular, we find that the Appellants have not shown that the Examiner failed to make a prima facie showing of obviousness with respect to claims 1, 2, 6-10, 31, and 32. Appellants failed to meet the burden of overcoming that prima facie showing.

Regarding independent claims 1 and 31, Appellants argue that Hung does not teach or suggest "a stair-case configuration[4] extending tomore [sic]

[4] At certain places in the Brief, Appellants present arguments regarding a "staggered configuration" rather than the claimed "stair-case configuration." (App. Br. 6, 9.) In the Reply Brief, Appellants state that "although the Applicant's Appeal Brief contains the word 'staggered', all the arguments are Footnote continued on the next page.

than two dies because of the manner in which the bonding wires are connected to the conductive leads," Khandros does not teach or suggest "the bond pads facing each other," and therefore Hung and Khandros cannot be combined. (App. Br. 7.) In addition, Appellants argue that there is no motivation to combine the teachings of Hung and Khandros. (App. Br. 7-8.) We do not agree.

As the Examiner correctly found, Hung teaches, among other things, two dies stacked in a stair-case configuration with bond pads facing each other (Ans. 4-5; Hung Fig. 2F; col. 3, l. 34 to col. 4, l. 7) and Khandros teaches attaching a third die so that the first, second, and third dies are stacked in a stair-case configuration (Ans. 5; Khandros Fig. 4A; col. 6, ll. 40-45; col. 7, ll. 4-65; col. 8, ll. 46-48, 60-63). We agree with the Examiner (Ans. 5) that it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Hung and Khandros and attach the third die of Khandros to the upper die of Hung, as taught by Khandros.

Consistent with the teachings of Khandros (col. 2, ll. 24-26; col. 7, ll. 35-39), the Examiner reasoned that the combination would increase the power and function of the semiconductor package without taking up a large area on the printed circuit board and would provide for easy inventorying of the semiconductor devices. (Ans. 5, 11.) In addition, we note that both

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applicable for the 'stair-case configuration'." (Reply Br. 3.) Because independent claims 1 and 31 clearly recite a "stair-case configuration" rather than a "staggered configuration," we treat Appellants' arguments regarding a "staggered configuration" as being directed to the claimed "stair-case configuration."

Hung and Khandros are directed to packaging multiple semiconductor chips in a single package module (Hung Abstract, col. 1, ll. 8-13, col. 2, ll. 18-25; Khandros Abstract, col. 2, ll. 24-29). We agree with the Examiner's reasoning and find that the Examiner has established a proper motivation to combine the teachings of the references.

Although Appellants are correct that the bond pads of Khandros do not "face each other," the Examiner cited Hung for this teaching (Ans. 4-5, 10). In addition, Appellants' arguments regarding the manner of connecting the bonding wires to the conductive leads in Hung are not convincing because they are not commensurate with the scope of the claims. Specifically, claims 1 and 31 merely require "attaching the upper die to a third die such that the lower die, the upper die, and the third die are stacked in a stair-case configuration." The claims do not require any particular manner of attaching bonding wires to the third die. Indeed, the claims do not require that bonding wires be connected to the third die at all. Furthermore, we agree with the Examiner that Hung discloses a plurality of leads and thus can be expanded to more than two dies. (Ans. 9; Hung Fig. 2F, col. 2, ll. 26-30, col. 3, ll. 56-57.)

Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claims 1 and 31 under 35 U.S.C. § 103(a). Dependent claims 2, 6, 8-10, and 32 were not argued separately and fall together with independent claims 1 and 31, from which they depend.

With respect to claim 7,[5] Appellants argue that Hung does not disclose a redistribution layer, as claimed. (App. Br. 7.) We do not agree. The Examiner found that Hung discloses a redistribution layer by disclosing "a layer that contains the bond pads 210 and provides electrical connections between the bond pads 210 and internal elements inside of the upper die 200; column 3, lines 42-47." (Ans. 5; *see also* Ans. 10.) We agree with the Examiner that, under a broad but reasonable interpretation of the claim, Hung suggests a redistribution layer.

In addition, Figure 9 of Khandros teaches a redistribution layer. (Khandros Fig. 9; col. 9, l. 57 to col. 10, l. 4.) Specifically, Khandros teaches conductive lines 906 that connect between bond pads 904 and terminals 908 formed at desired locations along the edges of the semiconductor device (*Id.*) and "[i]n this manner, the terminals of the semiconductor devices described herein can be re-routed from an initial location 904 to a desired (e.g., edge) location 908 on the semiconductor device." (Khandros col. 10, ll. 1-4.) This interpretation is not inconsistent with the Specification, which teaches that "[w]hen the bond pads are not suitably placed, a redistribution layer (not shown) may be formed to redistribute the interconnection pattern." (Spec. 4, paragraph [0020].) Using the redistribution layer of Khandros in the die of Hung would have been no more than the combination of familiar elements according to known methods, with no unpredictable results. *See KSR*, 127 S. Ct. at 1739.

[5] Appellants also argue claim 17 with claim 7. (App. Br. 7.) However, as the Examiner points out (Ans. 10), claim 17 has been withdrawn.

Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claim 7 under 35 U.S.C. § 103(a).

CONCLUSION OF LAW

We conclude that Appellants have not shown that the Examiner erred in rejecting claims 1, 2, 6-10, 31, and 32 for obviousness under 35 U.S.C. § 103.

DECISION

The rejection of claims 1, 2, 6-10, 31, and 32 for obviousness under 35 U.S.C. § 103 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

gvw

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